

NAVAL MEDICAL RESEARCH AND DEVELOPMENT News

Volume VI, Issue 8

August 2014

In this issue...

High Schoolers Intern at NMRC in SEAP Program	1
COs Messages	2
Cairo Capacity Building	4
Physical Properties of Nanomaterials	5
Navy Works with Air Force in Biomarker Assessment	6
Dental Corps Celebrate 102 Years	7
Two Navy Microbiologists	8
Patients Likely to Find Bone Marrow Donor	9
R&D Chronicles	10
Michigan State Univ. Student Trains at Cairo Lab	11
College Students Intern at NMRC in NREIP Program	12
NSMRL Civilian Receives Award	13
NMRC Research Speaks at NMHM Science Cafe	14

More stories inside

NMR&D News is an authorized publication of the Naval Medical Research Center, 503 Robert Grant Avenue, Silver Spring, MD 20910. *NMR&D News* is published monthly by the NMRC Public Affairs Office, 301-319-9378 or svc.pao.nmrc@med.navy.mil

Commanding Officer
Capt. John W. Sanders

Executive Officer
Capt. Elizabeth Montcalm-Smith

Director for Administration
Steven S. Legette

Public Affairs Officer
Doris Ryan

Graphic Layout & Design Editor
Mikelle D. Smith

<http://www.facebook.com/naulmedicalresearchcenter>



Use your
smartphone to
access our website!

High School Student Interns Participate in SEAP at NMRC

Story by Mikelle D. Smith, Naval Medical Research Center Public Affairs



SEAP intern Heather Lukas (right) shares her research poster with NMRC researcher Lt. Cmdr. Maya Williams (left) during the SEAP & NREIP poster presentation in the Behnke Auditorium. (Photo taken by Mikelle D. Smith, Naval Medical Research Center Public Affairs)

SILVER SPRING, Md., -- High school students participating in the Science and Engineering Apprenticeship Program (SEAP) will conclude their eight-week summer program at Naval Medical Research Center (NMRC), August 8.

According to the SEAP web site, "the goals of [the program] are to encourage participating students to pursue science and engineering careers ... and to make them aware of DON [Department of the Navy] research and technology efforts, which can lead to employment within the DON."

Since June, high school students participating in SEAP have filled the halls and laboratories at NMRC receiving one-on-one professional guidance from volunteer mentors, all who are researchers at the facility. Students had the opportunity to engage in various fields of scientific study under the directorates at NMRC.

"At first I was slightly intimidated, but over time I learned to be comfortable in the lab setting," said SEAP intern Heather Lukas, who is working in the Viral Rickettsial Department under Dr. Huan-Wei Chen. "It is very interesting to see that everyone is working on their own independent projects and at lab meetings I am able to present what I am doing to the researchers as well. Dr. Chen is very professional and he gives us freedom to do our work while making sure we are doing things correctly."

Lukas added, "At my high school I am part of the mentorship program. I hope to continue working with Dr. Chen here at NMRC to fulfill my senior project requirements, which would allow me to continue the research I am doing now to make a well-rounded senior project."

At NMRC, mentors choose SEAP interns based on their experience level and

(continued on page 3)

NMRC Commanding Officer's Message



One of the joys of living in Maryland is we get to experience the pleasure of four distinct seasons. Although each of them has its benefits, I have to say summer is my favorite. I love that it stays light well into the evening, we get to have cook outs and meet with friends at the neighborhood pool, and the pace of life seems to slow down (well actually, in looking at all the work taking place throughout the R&D Enterprise, I can't really say anything has slowed down). Summer also brings "summer interns" to our labs.

When they start showing up to NMRC in June, I can feel the excitement and enthusiasm for our work go up just a bit as we experience it through fresh eyes. I love to hear the chatter in the halls as the students explain to each other the importance of their projects or the cool technique they got to learn that day. I am gratified to see the pride they take in trying to master the material and conduct rigorous experiments. I am also very impressed by what they are able to accomplish.

We have had NMRC interns optimizing novel PCR assays for rickettsia, using new techniques to classify wound healing, searching for new pathogens from mosquitoes and ticks, contributing to malaria and diarrhea vaccine development, studying the effects of blast exposure, and evaluating the physiologic effects of synthetic oxygen carriers. Interns at NAMRU-SA have been working on using antimicrobial nanoparticles to reduce cranioplasty infections. NAMRU-D has interns supporting aeromedical projects, NSMRL interns have been working on automated boat control, and NAMRU-6 and NHRC interns have been integrally involved in epidemiology projects. This work has certainly benefitted their education, but it has also contributed to our mission.

Now that we are in August, summer is moving to its end and our interns are preparing to return to school. I am going to miss having them around and I'd like to thank them all for their enthusiastic work. I'd also like to thank Lt. Kim Edgel for doing such a fine job coordinating the NMRC program this year. I would especially like to recognize and thank the scientists throughout the enterprise who provide such excellent mentorship to our interns. Thank you all for another great summer.

**NMRC Commanding Officer sends,
John. W. Sanders III, CAPT, MC, USN**

NAMRU-Dayton Commanding Officer's Message

Change continues to be a positive theme at Naval Medical Research Unit – Dayton (NAMRU-D). The summer turnover is here as the command welcomes six personnel and bids farewell to four stellar military officers. Thank you all for your dedication, lasting contributions, and making a difference. Also, I would like to express my sincere appreciation to two of our key command players who retired.

First, Cmdr. Mike Reddix, congratulations and Bravo Zulu to "Bat" on a very successful 22 year career in our Navy, and an unprecedented final tour as the NAMRU-D Executive Officer. Second, Col. Glen Hover, our USAF Liaison and a true ambassador for jointness, who retired from the USAF after an epic 30 years. The foundation has been laid and I'm excited to see the future of our scientific research thrive.

We have a myriad of active projects within both Directorates. In our Aeromedical Research Directorate: Subject testing and recruiting continues with our pharmaceutical fatigue countermeasures study conducted for Air Force Special Operations Command (AFSOC) and sponsored by USAF Surgeon General.

Subject recruitment and data collection began for the latest motion sickness study using intranasal scopolamine. Principal investigators for spatial disorientation mitigation training successfully completed three operational simulator based illusions and our scientists are currently engaged in the production of three more different illusion scenarios.

The hypoxia sensors work is complete with testing of mask integration and now moving into the next phase of research of sensors with simulated breathing at altitude. The joint project of F-22 oxygen delivery is testing different oxygen concentration at different altitudes to determine cognitive and physical performance effects. The U.S. Coast Guard recently requested assistance to develop a laser eye protection solution in response to nuisance laser glare incidents that jeopardize homeland security and search and rescue missions.

Current focus of our Environmental Health Effects Research Directorate is the recently awarded Defense Medical Research and Development Program (DMRDP), Military Operational Medicine Joint Program Committee 5 (MOMJPC5) projects, which assess the toxicity of burn pit emission (with and without sand pre-exposures) and neurological effects of jet fuel exposure. Both projects will be done in collaboration with the USAF 711th Human Performance Wing/Behavioral Systems (HPW/RHDJ) experts. Results are projected to mitigate health risks and improve operational risk management and medical treatments.

During this time of change, the pursuit of jointness remains constant and has expanded with our tri-service partners and the Federal Aviation Administration (FAA). High level working meetings were established and will continue on a regular basis to coordinate efforts and concerns in the future. NAMRU-D continues to CLIMB, ROLL, and BOOM as a global research leader delivering solutions for our joint warfighters.

**NAMRU-Dayton Commanding Officer sends,
Jeffrey M. Andrews, MSC, USN**



High School Student Interns Participate in SEAP at NMRC

(continued from page 1)

interest in particular fields of study. In many cases, returning interns are able to work with the same mentors, continuing previous study as well as opening up new and different experiences. One such returning SEAP intern is Caitlin Whittier a two-year participant.

"Last year I was a SEAP intern with OUMD [Operational Undersea Medicine Directorate] and loved the experience so I reapplied," said Whittier, whose mentor is Dr. Michael Bodo. "This year I was able to see all aspects of my research focus [area], which I am extremely grateful for. I will be attending George Washington University as a freshman next month and I am thankful for all the help and knowledge I've received from the researchers."

Not all SEAP interns are returning, some are first timers, like William Green, who simply loves the field of science and

wishes to learn more about the Navy's role in research.

"I have been interested in medicine, biology and chemistry for quite a while so I thought this would be a great opportunity to gain some experience over the summer," said Green, who is assigned to Operational Undersea Medicine Directorate (OUMD) under Dr. Aaron Hall. "I would love to come back to this facility next summer and even work here in my future. I would like to major in biology and chemistry then join the Navy to go to medical school and serve as a doctor."

At the completion of the eight-week internship, students are required to submit a poster on research they have conducted during the program. This allows them to show what they have learned from their mentors as well as share their personal experiences as a summer intern.

"I hope that programs like this are around in the future for my daughter," said NMRC researcher, Lt. Kimberly Edgel, the deputy head of NMRC's malaria department and coordinator of the SEAP program. "The role of mentorship in career development is becoming more and more prominent. These interns are very bright and I believe the Navy views these individuals as the scientists of the future ... you can never put enough emphasis on the progression of the students' education and career experience."

Students interested in SEAP should be going into their sophomore year of high school and 16 years of age. They must also be U.S. citizens. For more information on the SEAP program visit the web site at <https://seap.asee.org>.



Photos taken by Mikelle D. Smith, Naval Medical Research Center Public Affairs

Lab in Cairo Engaged in Laboratory Capacity Building in Liberia

Story courtesy of NAMRU-3 Public Affairs



NAMRU-3's Lt. Cheryl Rozanski (right) and her team, heading for the LIBR unit in remote Buhulun Village in Lofa County. (Photo courtesy of NAMRU-3 Public Affairs)

CAIRO – The U.S. Naval Medical Research Unit No. Three (NAMRU-3) is establishing an important laboratory capacity building project in Liberia.

The project is designed to address diagnostics for several arbo-viruses including Lassa Fever, a zoonotic hemorrhagic fever with a history of annual outbreaks in Liberia.

Lt. Cheryl Rozanski and her team from NAMRU-3's Virology and Zoonotic Disease Research Program visited three

clinics in Liberia to assess their current capabilities.

These included the Liberia Armed Forces Medical Clinics located on Camp Edward Binyah Kesselly (EBK) and Camp Tubman. Besides the military clinics, the team visited Foya Hospital in Lofa County as well as Phoebe Hospital in Bong. Foya Hospital receives patients from Guinea and Sierra Leone, and Phoebe Hospital, which is centrally located, receives Liberian patients and provides training for all of the laboratory technicians in Liberia.

The challenge that faces the NAMRU-3 team in collecting samples is the need to keep them cold after collection and during their transport to the laboratory where they will be tested for Chikungunya, Crimean Hemorrhagic Fever, Yellow Fever Virus, West Nile Virus, Rift Valley Fever, Lassa Fever, and dengue.

For this reason, NAMRU-3 is buying dry ice makers in order to keep the collected samples cold during the transport process and small -80 degree freezers for storage of the samples until shipped to the National Reference Laboratory in Monrovia, Liberia.

Although this was an initial visit, it enabled the NAMRU-3 team to see the harsh realities of what is needed to establish a link between three medical clinics that did not previously have direct communications.

“When we visited the hospitals, we found ourselves in ICU units that had patients with serious infectious diseases. Seeing those patients made me appreciate that every sample I deal with represents a life,” said Mustafa AbdelAziz, NAMRU-3 lab technologist who participated in the field trip.

This effort is supported by GEIS, the Global Emerging Infections Surveillance and Response System Division of the Armed Forces Surveillance Center which is an integrated worldwide emerging infectious diseases surveillance system.

The mission of NAMRU-3 is to study, monitor, and detect emerging and re-emerging disease threats of military and public health importance, and to develop mitigation strategies against these threats in partnership with host nations and international and U.S. agencies in CENCOM, EUCOM, and AFRICOM areas of responsibility.

Physical Properties of Nanomaterials in the Atmosphere

Story by J. Mueller, NAMRU-Dayton

DAYTON, Ohio, - There is intense interest in nanomaterials in the scientific community because their physical and chemical properties are often different than those of their bulk counterparts.

There has been a great deal of effort over the past few years to design, produce, and characterize nanomaterials. A “nanomaterial” is defined as a material with one external dimension in the size range of 1-100 nanometer (nm). A nanometer is one billionth of a meter.

The relative difference between a nanometer and a meter is comparable to the difference between a millimeter and the distance from Wright-Patterson Air Force Base, Ohio, to the tip of Long Island, New York.

A nanomaterial may be a sheet of atoms, like the thin graphene sheets that earned the Nobel Prize in Physics in 2010, it may be a rod with circumference on the nano-scale, or it may have all three dimensions on the nano-scale.

With the advent of engineering nanomaterials, there has also been an effort to identify environmental and incidental nanomaterials (INM).

INM have been found in specialized work such as grinding and arc welding and from common sources such as engine exhaust.

The military is increasingly using engineered nanomaterials (ENM), such as those added to jet fuel and paints. Due to increased exposure to ENM and INM by military members, there is a need to understand the associated risks.

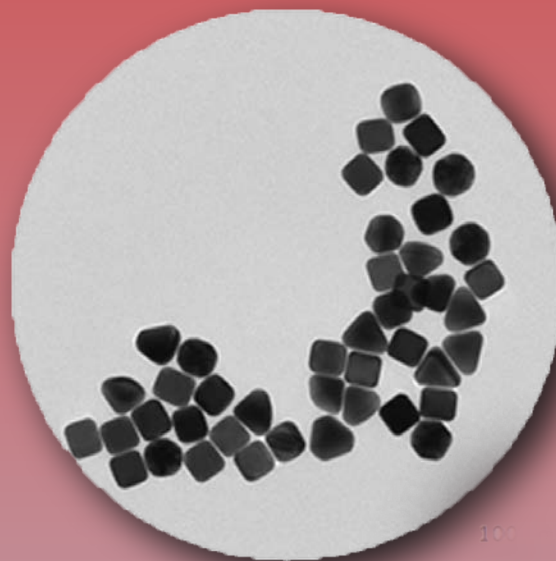
For INM and possible environmental contamination by ENM, it is important to understand physical properties and the likelihood of exposure.

In the NAMRU-D Fall 2013 Science Update, a proof-of-principle nanoparticle generation system for future *in vivo* inhalation experiments was presented. NAMRU-D is now designing a collaborative project with Dr. Saber Hussein of the USAF 711 HPW Molecular Bioeffects Branch/RHDJ to study the physical properties of three nanoparticles in a test atmosphere.

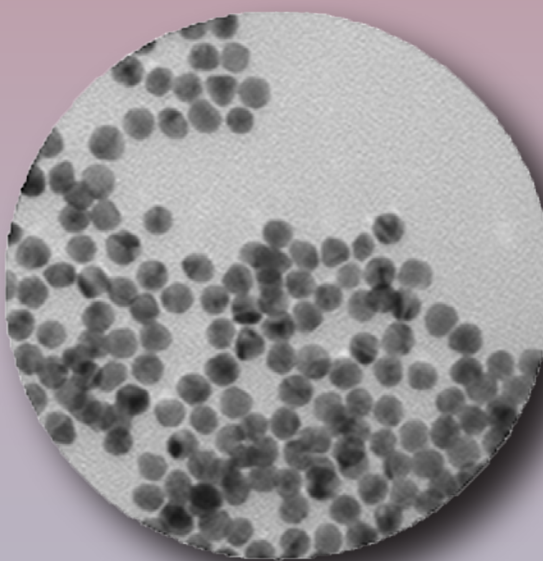
The goal of the work is to determine the persistence of nanomaterials that have been lofted into the atmosphere.

Do nanomaterials stay in the air for an indeterminate period of time? Do they settle to the floor or cling to vertical surfaces? Are they easily re-introduced from a surface to the atmosphere?

This work, in conjunction with future *in vivo* studies, will help to assess the likelihood of inhalational exposure to nanomaterials and the effects to personnel.



(Above) Transmission electron microscopy (TEM) images of 100 nm nanoparticles. A “nanomaterial” is defined as a material with one external dimension in the size range of 1-100 nanometer (nm). A nanometer is one billionth of a meter. (Photo courtesy of Dr. Saber Hussein)



(Left) Transmission electron microscopy (TEM) images of 50 nm nanoparticles. A “nanomaterial” is defined as a material with one external dimension in the size range of 1-100 nanometer (nm). A nanometer is one billionth of a meter. (Photo courtesy of Dr. Saber Hussein)

Navy and Air Force Labs Conduct Biomarker Assessment for Resilience Prediction

Story by Lt. Cmdr. Wilfred Wells, NAMRU-Dayton

DAYTON, Ohio - Researchers from Naval Medical Research Unit - Dayton (NAMRU-D) and the Naval Medical Research Unit - San Antonio (NAMRU-SA) are conducting biomarker assessment for resilience prediction.

NAMRU-D is collaborating with the Air Force 342nd Training Squadron (TRS), U.S. Air Force School of Aerospace Medicine, Neurostat, and the 711th Human Performance Wing Applied Neuroscience Branch on a study to investigate the appearance of biomarkers of stress resilience and performance during the Pararescue Indoctrination Course.

The Air Force led project began data collection May 16 at Lackland Air Force Base in San Antonio, Texas, and will continue on alternating weeks for nine weeks.

The information collected will serve as the building blocks for developing a real-time biomarker detection tool and future human performance augmentation.

NAMRU-SA is responsible for collecting, processing, storing and shipping the blood samples to the U.S. Air Force School of Aerospace Medicine for analysis.

NAMRU-D assists the 711th Human Performance Wing Applied Neuroscience Branch with the administration of several psychological, physiological and cognitive assessments.

Warfighter resilience is immensely important within the military due to the uncontrollable stressors that many of our warfighters face today.

Stressors such as the psychological consequences of improvised explosive device (IED) exposure are categorized as uncontrollable stressors.

Understanding how resilience can be enhanced on an individual basis will improve operational performance and reduce attrition rates in training.

Observing biomarkers like neuropeptide Y (NPY) and dehydroepiandrosterone (DHEA) in an Air Force training

environment may provide insight into the coping mechanisms available for warfighters.

The research team will try to determine if NPY or DHEA play a role in the control of cortisol and/or norepinephrine levels during high stress.

The identification of these relationships can lead to the development of assays that can be used by medical communities to identify warfighters who are under high levels of stress.

Once identified, these individuals could use supplementation, for example, to mitigate high stress.

Overall, this study has developed a partnership between the Air Force and the Navy to advance knowledge to improve the health and readiness of our active duty service members.

*NMRC would like to wish the Navy Dental Corps
Happy 102nd Birthday!*

AUGUST 22, 1912

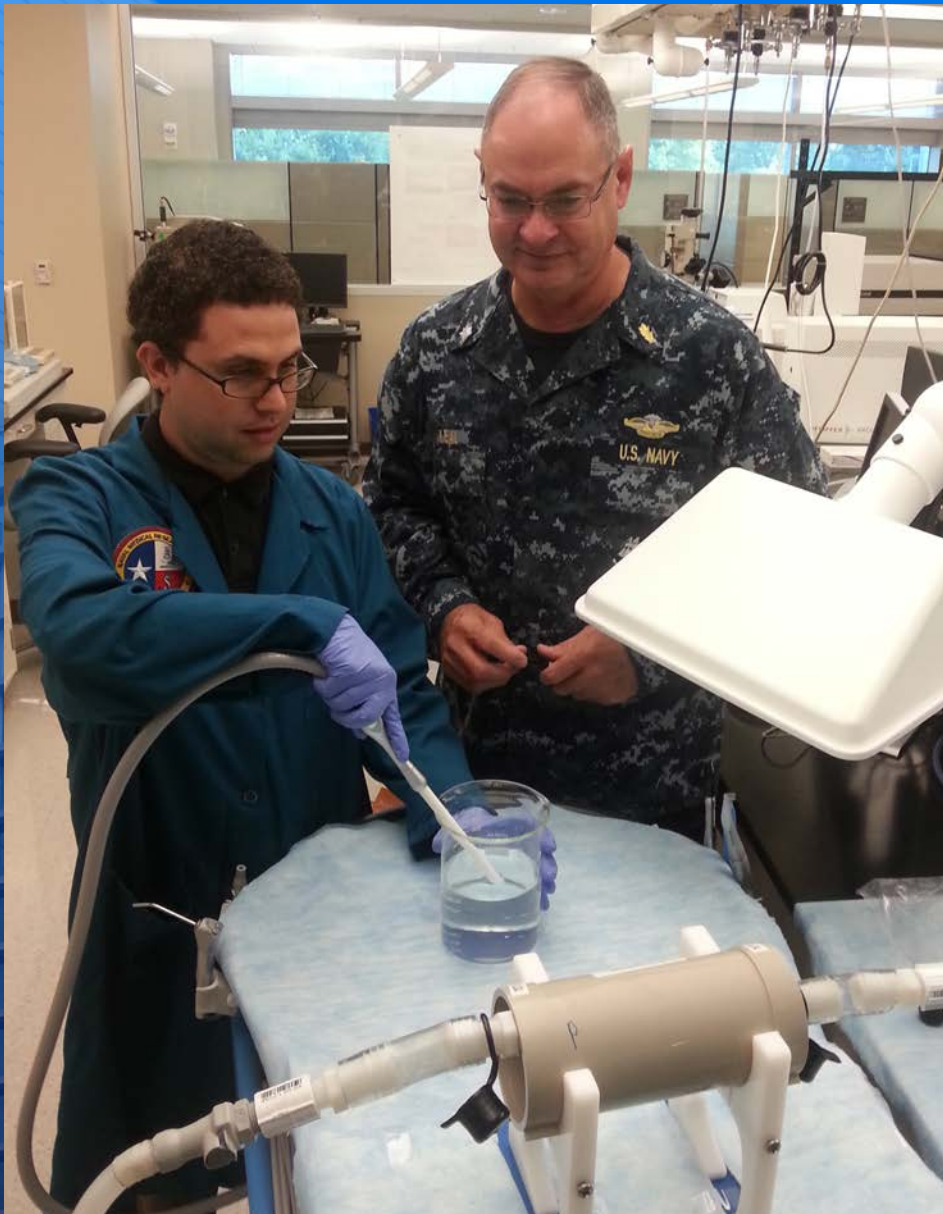


Graphic illustration by Mikelle D. Smith, Naval Medical Research Center Public Affairs



Dental Corps Celebrate 102nd Birthday

Story by Capt. Jonathan Stahl, NAMRU-San Antonio



Cmdr. David Leal (right) and Mr. Eric Botts Jr. (left) flush an amalgam chair side separator to characterize dental wastewater. (Photo courtesy of NAMRU-San Antonio Public Affairs)

SAN ANTONIO, Texas - On August 22 the Navy Dental Corps will celebrate its 102nd anniversary. Today's Dental Corps has a proud heritage and a commitment to providing high quality and compassionate patient care while maintaining an optimal state of operational dental readiness.

Presently, there are more than 1400 active-duty and reserve Dental Officers

serving on a variety of platforms including ships, Marine Corps bases, Navy Mobile Construction Battalions, overseas and shore facilities.

Further, from World War I through the more recent operations in Iraq and Afghanistan, Dental Corps personnel have served admirably as part of forward deployed missions to maintain the combat

readiness of frontline forces. In times of peace and conflict, Dental Corps officers along with dental assistants, hygienists, and auxiliaries have steadfastly helped assure our nation has a medically ready fighting force.

The proud history of the Dental Corps extends beyond their vital clinical role, as they have also excelled in conducting world class research.

The Navy dental research facility was initially established in 1947 at Great Lakes, Illinois to address dental and operational healthcare needs of the military and continues today at the Naval Medical Research Unit - San Antonio (NAMRU-SA).

The role of Navy dental research expanded over the years to focus on addressing dental and biomedical problems that decrease operational readiness, addressing emergent dental problems, and providing data to improve management of the Dental Corps.

Currently, the Craniofacial Health and Restorative Medicine Directorate at NAMRU-SA is composed of three departments whose research efforts remain aimed at having a positive impact on the health and readiness of Sailors and Marines through treatment, detection, and prevention of craniofacial disease and injuries.

Cmdr. David A. Leal, DDS, heads the Biomaterials and Environmental Surveillance Department. Currently, researchers are working to develop a novel composite resin loaded with titanium nanoparticles to prevent new and recurrent dental caries around fillings.

As the lead for Navy mercury abatement efforts, scientists research novel means to reduce release of mercury and other contaminants into public wastewater systems. Efforts include improving the

(continued on page 15)

Around the World and Back:

A Tale of Two MSC Microbiologists

Story by Lt. Cmdr. Maya Williams & Lt. Cmdr. Matthew Kasper



Lt. Cmdr. Matthew Kasper and Lt. Cmdr. Maya Williams pin new ranks on each other during their promotion ceremony at the U.S. Naval Medical Research Unit No. Six (NAMRU-6) in Lima, Peru, September 2, 2011. (Photo courtesy of Lt. Cmdr. Maya Williams, Naval Medical Center Public Affairs)

SILVER SPRING, Md. – August fourth marks the 67th birthday of the Medical Service Corps.

Lt. Cmdr. Maya Williams, Head of the Viral and Rickettsial Diseases Department at the Naval Medical Research Center and Lt. Cmdr. Matthew Kasper, Deputy Director for the Global Emerging Infections Surveillance and Response System at the Armed Forces Health Surveillance Center (AFHSC-GEIS), wrote about experiences as a dual-military couple working in Research and Development while serving as Medical Service Corps Officers.

After completing PhDs at the University of Michigan, we decided to join the Navy Microbiology program.

We weren't sure exactly what lay ahead of us, but we were ready for an adventure and our first nine years have not let us down.

Our duty stations have included the National Naval Medical Center in Bethesda, Maryland; the Naval Medical Research Center in Silver Spring, Maryland; the U.S. Naval Medical Research Unit No. Two in Jakarta,

Indonesia; the U.S. Naval Medical Research Unit No. Six (NAMRU-6) in Lima, Peru; and, AFHSC-GEIS in Silver Spring, Maryland.

Each duty station has brought with it a new set of experiences and challenges; however, the one constant has been the many "hats" that you must wear while working in Navy R&D.

Not only do you have to be a great scientist, but you must also flourish as a leader, diplomat, and businessman.

While working overseas you also have the added challenge of doing all of this with cultural sensitivity and the understanding that we are guests of the host nation.

During our overseas tours we had the opportunity to work with other U.S. government agencies and a variety of host-nation partners on mutually beneficial infectious disease projects.

We visited both remote and urban field sites, oversaw operations, and met a wide range of study participants and local health care providers.

We have been involved in the response to

a number of emerging diseases including the deadly H5N1 bird flu, the novel H1N1 influenza pandemic, dengue outbreaks, the emergence of MERS-CoV and the introduction of chikungunya virus into the Americas.

We are grateful that we have had the opportunity to execute the force health protection mission on a global scale and play a key role in global health security.

There are many challenges to working overseas, most of which cannot be explained in words, but must simply be experienced firsthand.

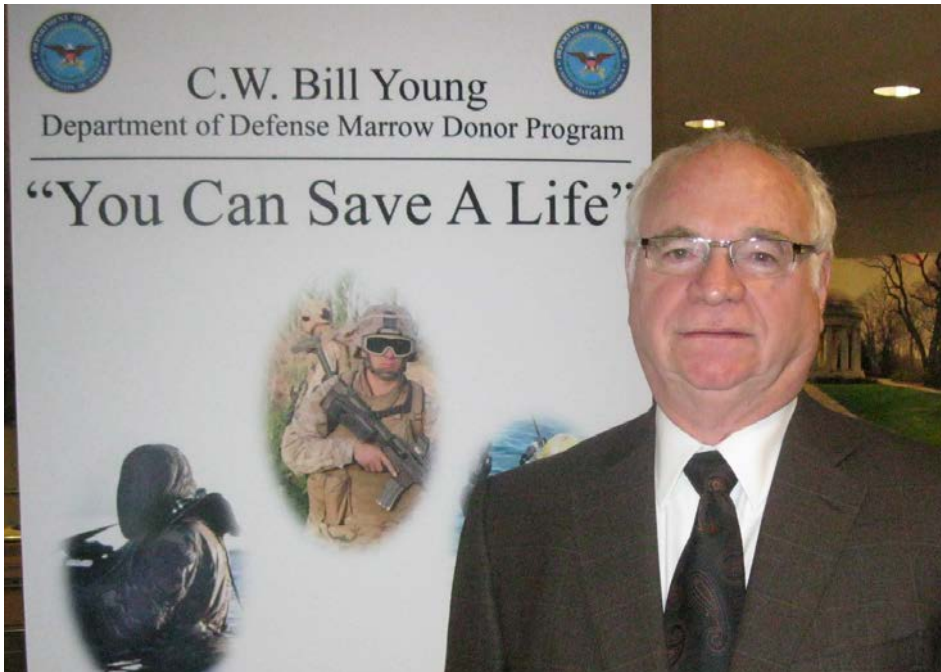
Now that we are back in the U.S., we use those experiences to advance the efforts of Navy R&D to enhance the force health protection mission.

Our first nine years of service provided us the opportunity to develop a diverse set of professional skills.

We look forward to the future opportunities that are in store as we continue to advance force health protection and global health efforts.

Patients Likely to Find Suitable Bone Marrow Donor on National Marrow Donor Registry

Story by Doris Ryan, Naval Medical Research Center Public Affairs



Dr. Robert Hartzman, one author of the paper, is the Head of NMRC's Bone Marrow Research Directorate/Manager for the C.W. Bill Young/DoD Marrow Donor Recruitment and Research Program. (Photo courtesy of Naval Medical Research Center Public Affairs)

"There are more than 700,000 individuals who have registered with the DoD bone marrow program. Any one of them could be genetically matched with a patient in need of a hematopoietic (blood forming cells) transplant," said Dr. Robert Hartzman, one author of the paper and Head of NMRC's Bone Marrow Research Directorate/Manager for the C.W. Bill Young/DoD Marrow Donor Recruitment and Research Program. "The potential DoD donors who volunteer are added to the unified national donor file of NMDP and are extremely important as they are healthy and young and willing to give of themselves to reach out to someone they will probably never meet to give a stranger their best opportunity for full life."

For the last twenty years, more than 5,000 individuals in DoD have donated marrow for transplants. Marrow donor drives are offered at every DoD facility across the world that would like to participate, added Hartzman.

SILVER SPRING, Md., - Seriously ill patients without a suitably matched family member, can possibly find an available bone marrow donor on the registry of the National Marrow Donor Program (NMDP) according to a study published in the New England Journal of Medicine, July 24.

Bone marrow transplants are needed for patients with blood and marrow cancers such as leukemia and lymphoma, as well as other diseases.

The study researchers created population-based genetic models for 21 U.S. racial and ethnic groups to reflect the large diversity of the U.S. population represented in the NMDP. Donors are matched to patients based on human

leukocyte antigen (HLA) markers, which are inherited.

The cells needed for the transplants come from adult donors or banked umbilical cord-blood units.

Depending on the patient's race or ethnic background, the study found that a high percentage of patients could have a suitably matched and available donor on the registry.

Since 1991, the Naval Medical Research Center's (NMRC) Bone Marrow Research Directorate has played a critical role in supporting DoD bone marrow drives and identifying potential bone marrow donors to add to the national registry.

NMRC's Bone Marrow Research Directorate provides military contingency support for casualties with marrow toxic injury due to radiation or chemical warfare agents.

The directorate performs laboratory research that supports technology innovations to make highly reliable and cost-effective DNA-based typing for marrow transplants.

The study was funded by the Office of Naval Research and the Department of Health and Human Services.

It can be found at <http://www.nejm.org/doi/full/10.1056/NEJMsa1311707>.

facebook

Naval Medical Research Center is on Facebook!
Stay connected with us via social media.
Please visit and like our page
@ Naval Medical Research Center for updates.



Graphic illustration by Mikelle D. Smith, Naval Medical Research Center Public Affairs

R&D Chronicles:

When Errol Flynn Wore Aviator Wings

Dive Bomber & Naval Aviation Medical Research of World War II

By Andre B. Sobocinski, Historian, Bureau of Medicine and Surgery

Part I

“Colorful, indeed, is the word which should be most clearly emphasized, for not only do the modern experiments in aviation medicine, elaborately detailed herein, have unique and fascinating pictorial interest, but the Warners have photographed this picture in some of the most magnificent Technicolor yet seen.”

~Bosley Crowther



Dive Bomber, Lt. Lee (Flynn, left) and a second class pharmacist's mate, known simply as "Lucky" (Allen Jenkins, right), sit on the front bumper of a Navy ambulance amidst a crowd of Navy and Army officers. (Photo courtesy of BUMED Public Affairs)

Dive Bomber holds the distinction of being a rare “non-war” military film.

Released just over three-months before the attack on Pearl Harbor, the film stars Errol Flynn in the role of “Lt. Douglas Lee,” a physician with degrees from “Harvard, Hopkins, [and] Cambridge” who joined the Navy because of the “active medical life” it offered. The role is a drastic departure for the action-adventure star.

There is no Spanish Armada or Basil Rathbone to wrangle with (and Flynn’s sword in this film is only ceremonial!)

In *Dive Bomber* Flynn contends with host of aviation blackouts, high-altitude sickness and night blindness. His “weapon” of choice against these “foes” is medical research.

Early in the film when a pilot loses consciousness trying to pull his plane from a nosedive, Lt. Lee is spurred on his quest to solve the puzzle of aviation blackouts.

With the assistance of fellow flight surgeon (Ralph Bellamy) and a pilot-turned guinea pig (Fred MacMurray),

Lee devises a compression belt that enable pilots greater resilience during physiological-intense air maneuvers.

Despite his character’s name, there is little doubt that Flynn is portraying actual aviation medical researcher, and *Dive Bomber* technical consultant, Cmdr. John Ryer Poppen, Medical Corps, USN (1893-1965).

Throughout the 1930s and 40s, Poppen pioneered protective measures for overcoming issues of acceleration or “G Stress.”

With the development of higher speed combat aircraft like SBD dive bombers and Curtiss XSB2C *Helldivers* came the increased risk of physiological problems for pilots.

Accelerating in dive maneuvers lead to deprivation of blood in the brain, a pooling of blood in abdomen and lower limbs, and ultimately for some, the loss of consciousness.

Under Poppen’s direction, the Navy led early studies at the Fatigue Laboratory

at Harvard University and later at the Naval Aircraft Factory in Philadelphia, Pennsylvania, resulting in the development of the compression or tubular belt (also known as the “Poppen Belt”) and soon after, the more successful, gradient pressure suit (or “Anti-G Suit”).

Though neither the belt nor the suit prevented the risk of aviation blackouts entirely, they enabled pilots to endure longer periods of acceleration in flight.

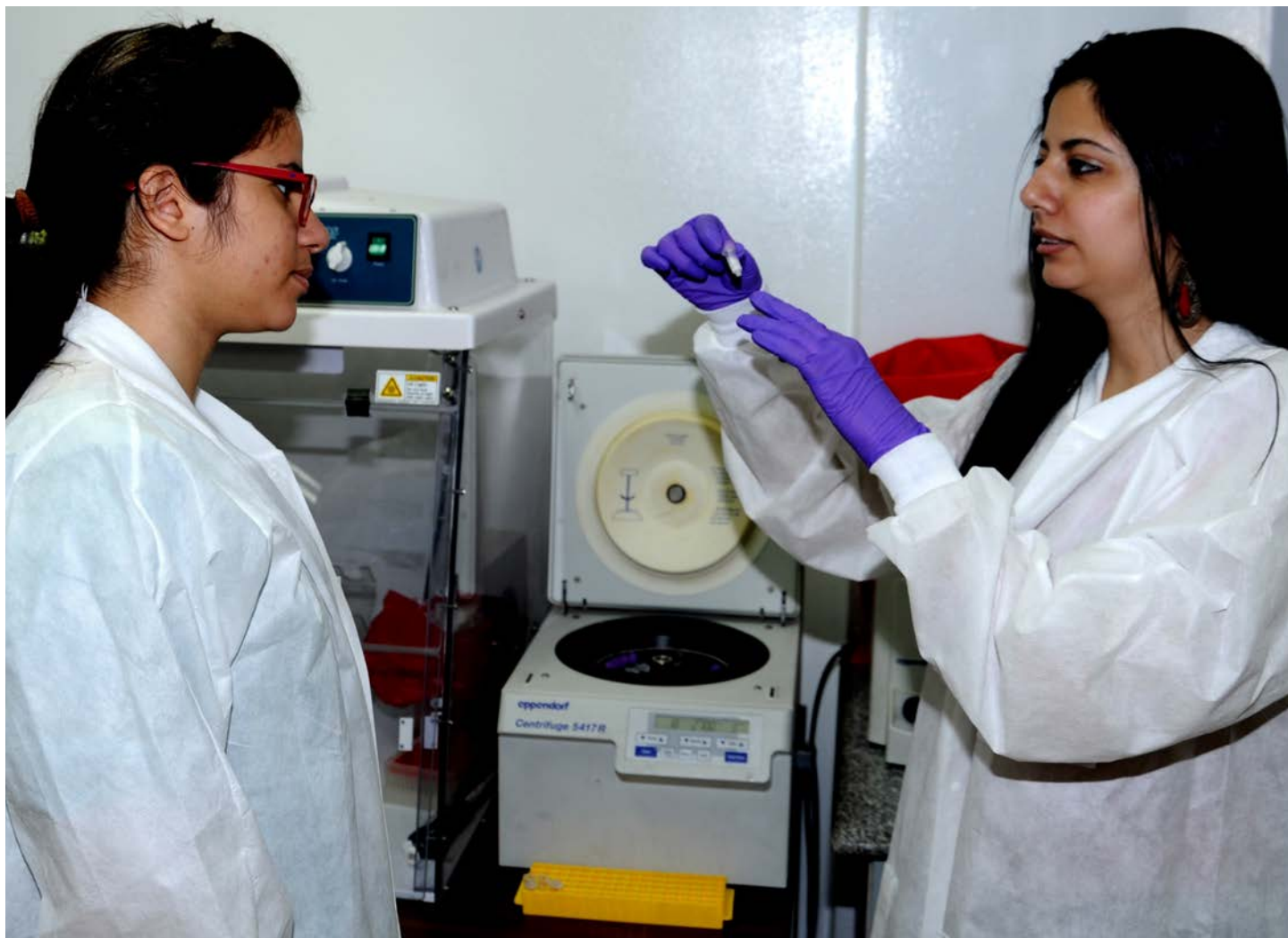
The first Anti-G Suit was fully flight tested and ready for combat in 1943. Many World War II combat pilots found the early suits to be overly cumbersome and stifling to wear, especially in the muggy temperatures of the Pacific theater.

Today, military aviators wear a multi-functional, flame resistant Anti-G suit that is considerably more lightweight than the original.

Though the suit technology has continued to evolve, the very science behind it—first conceived by Poppen and others—has remained the same.

Michigan State University Student Trains at Lab in Cairo

Story courtesy of NAMRU-3 Public Affairs



NAMRU-3's Vector Biology Research Program's Nermeen Fahmy (right) explains a DNA purification step needed before sequencing to trainee Laura Azouz, Michigan State University, sophomore. (Photo courtesy of NAMRU-3 Public Affairs)

CAIRO, Egypt-- Laura Azouz, a sophomore at Michigan State University, recently finished two-weeks training at the U.S. Naval Medical Research Unit No. Three (NAMRU-3).

Azouz was assigned to the Vector Biology Research Program (VBRP), working with Dr. Hala Bassaly and Ms. Nermeen Fahmy.

A Michigan State University (MSU) student who is in Cairo for the summer, Azouz began her training at NAMRU-3 in June. Fahmy trained her on PCR and how to extract and sequence DNA.

Bassaly also mentored her on some of the

theoretical aspects of the work being done in VBRP.

Azouz, who plans to major in chemical engineering, welcomed the chance to have work experience in a research facility.

She said that her previous laboratory experience had been in school or at the university, where experiments were planned for only the length of a class period.

At the VBRP lab, she was able to see how experiments were planned and carried out over several days.

She also said she liked the academic atmosphere in the VBRP lab, where

people not only do lab work, but are also relating their work to research projects that can be applied to advanced academic degrees.

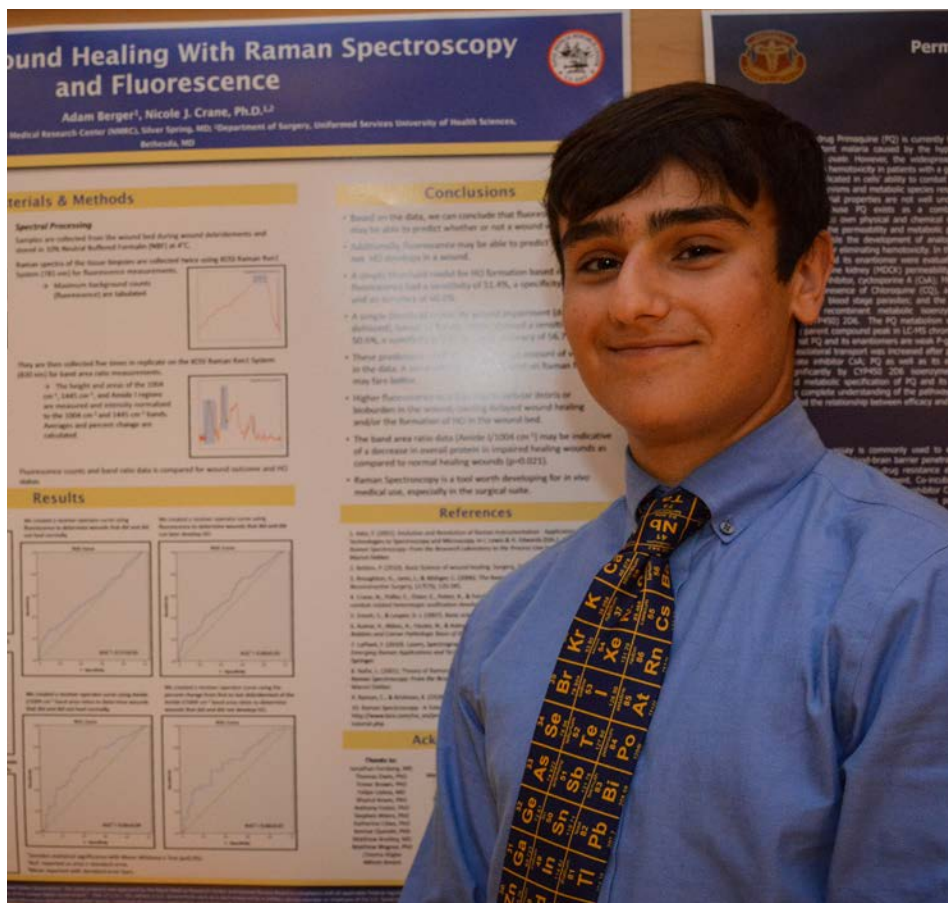
Azouz was really pleased to have this opportunity at the beginning of her college career.

She plans to take a class with a professor at MSU whose work involves identifying proteins and then working backwards to sequence the DNA that will produce those proteins.

Her work with Fahmy on PCR and sequencing will help her to better understand this interesting new field.

College Students Participate in DoD Summer Internship at NMRC

Story by Mikelle D. Smith, Naval Medical Research Center Public Affairs



NREIP intern Adam Berger stands next to his research poster during the NREIP & SEAP poster presentation in the Behnke Auditorium. (Photo taken by Mikelle D. Smith, Naval Medical Research Center Public Affairs)

SILVER SPRING, Md., -- Students from various colleges and universities have spent several weeks at Naval Medical Research Center (NMRC) working with military and civilian researchers via the Naval Research Enterprise Internship Program (NREIP).

A 10-week in-depth paid internship program, NREIP was designed specifically for undergraduate and graduate level college students. The program gives these young adults an opportunity to participate in research at a Department of the Navy (DoN) laboratory during the summer months.

The ultimate goal of NREIP is to encourage participants to pursue science and engineering careers, as well as

further their education all while receiving on-the-job experience and guidance from laboratory personnel. In many cases, program participation can lead to networking abilities and possible employment at DON facilities.

"NMRC is such a great place and they have so many different projects going on all which sort of have an immediate impact for the Navy and the world," said NREIP intern Adam Berger, a sophomore attending the University of Maryland-College Park, Maryland. "Last year I was a SEAP intern here at NMRC with Dr. Crane in OUMD [Operational Undersea Medicine Directorate], and I had the opportunity to return as a NREIP intern with her. Dr. Crane has allowed me to be autonomous in the lab, which has truly

opened my eyes to being a researcher. I look forward to continuing with the program and possibly returning next summer."

At NMRC students are involved with the directorates at the facility. Based on the individual's degree major and area of focus, they are placed with NMRC researchers, all of whom volunteer as mentors to participate in NREIP.

"When I reported to NMRC I was appointed as the STEM [Science, Technology, Engineering and Mathematics] liaison and I act as the student coordinator for the NREIP and SEAP programs," said NMRC researcher, Lt. Kimberly Edgel, the deputy head of NMRC's malaria department. "This program is a highly competitive program and we have a lot of students return who tell others to apply as well. This is a very good experience and exceptional way to gain exposure for the college interns. They learn from their mentors, whether civilian or military, the possibilities of doing research in the DoD and opportunities available to them."

Currently, there are eight NREIP students split between three directorates at NMRC. Berger, who works under Dr. Nicole Crane in OUMD, went on to discuss his experience in the lab. NREIP students are also required to put together a final research poster, in which they discuss and share findings based on a study topic they selected in the first week of the program.

"I never realized how much the Navy did in terms of research," said Berger. "My experiences as a SEAP intern and now an NREIP intern in a Navy facility, has opened my eyes to the possibility of actually becoming a research officer one day. It is definitely something I am truly considering in my future."

Eligibility for NREIP is determined based on the student's academic achievement, personal statements, recommendation, and

(continued on page 15)

NSMRL Financial Manager Awarded the Under Secretary of Defense (Comptroller) Financial Management Award

Story courtesy of NSMRL Public Affairs



Ms. Lorraine Nudd received the 2013 Financial Management Award from the Under Secretary of Defense. Ms. Nudd was recognized for improving NSMRL's efficiency and effectiveness in three areas: science execution, strategic direction and command responsiveness. (Photo courtesy of NSMRL Public Affairs)

GROTON, Conn. – The Under Secretary of Defense (Comptroller) recognized Ms. Lorraine Nudd as recipient of the 2013 Financial Management Award.

Her award read, “As the Financial Manager at the Naval Submarine Medical Research Laboratory (NSMRL), Ms. Nudd improved NSMRL's efficiency and effectiveness in three areas: science execution, strategic direction, and command responsiveness.

These resulted in recognizable cost savings as well as better products for the Submarine Fleet.

She developed a standardized, streamlined, financial budgeting process; consequently refining and accelerating the execution pathway of NSMRL's mission of conducting research for the Submarine Fleet.”

During an awards ceremony Capt. Steven Wechsler, NSMRL commanding officer said, “Ms. Nudd has my strongest endorsement, and she is most deserving of the Under Secretary of Defense (Comptroller) Financial Management Award. I am well cognizant that this honor is a reflection of Ms. Nudd's role as an inspiring leader. NSMRL could not execute its mission without Ms. Nudd's

competence and dedication.”

Her solutions were often incorporated as the standard for all Navy Medicine Research Commands.

She produced exact solutions in minimal time, with minimal disruption to the investigators' progress, earning her a reputation as the “go to” person at NSMRL.

In addition to Nudd's basic Financial Management duties she serves as an integral member on the Command Strategic Steering Committee and Command Planning Team.

Located on Submarine Base New London, Groton, Connecticut, NSMRL conducts research into Submariner Wellness, Psychological Fitness, Shipboard Health and Performance, Underwater Bioeffects and Submarine Survival and Escape, and Human Systems.

NSMRL serves as the Commander, Submarine Forces' human technology laboratory.

Researchers have access to three submarine squadrons in Submarine Group Two; the Navy Submarine School; the Naval Submarine Support Facility; Naval Undersea Medical Institute; and the Electric Boat Division of General Dynamics, which builds the nation's submarines.

NSMRL's accomplishments continue to be many and varied and include scientifically based recommendations for submarine rescue procedures, submarine atmosphere limits, advanced sonar system capabilities, diver/sonar safe distances, and symbology for visual displays.

NMRC Researcher Discusses Undersea Medicine Research at Medical Museum Science Café

Story by Doris Ryan, Naval Medical Research Center Public Affairs

SILVER SPRING – Capt. David Regis, head of the Undersea Medicine Department at the Naval Medical Research Center, spoke to community members at the Silver Spring Civic Building in the monthly event sponsored by the National Museum of Health and Medicine, July 22.

According to Regis, continued research drives new ways of keeping divers and submariners safe, in addition to the Navy's overall mission in the global community.

He spoke about the latest research in decompression sickness and diving and submarine rescue. This included contingency plans and scenarios for bringing people back to the surface from a disabled submarine, as well as methods to decrease the time to decompress divers in an emergency situation or in remote location where equipment is limited. He pointed out that NMRC has uncovered approaches that can help to reduce the risk of decompression sickness.

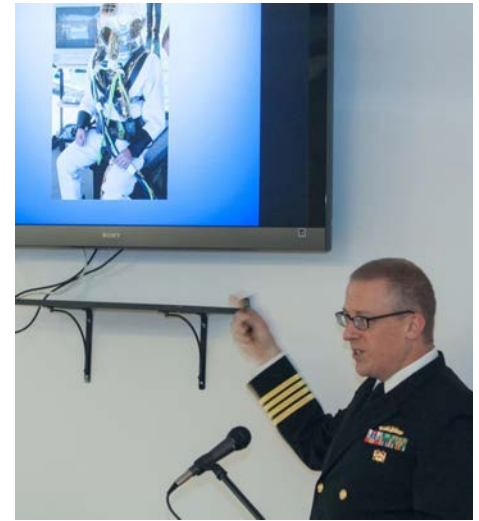
"No one knows the whole picture when

it comes to decompression sickness," explained Regis. "New research at our lab and others has been promising in shedding further light on the underlying physiology."

Part of his lecture included information on an approach that looks at ways of treating decompression sickness without a recompression chamber, the current mainstay of treatment. He mentioned studies that examine the effects of a certain medication on decompression sickness that could affect the risk of decompression sickness if taken while in a hyperbaric scenario.

He pointed out that this is important because it has been found that this medication otherwise extends the crew viability for another day or two while awaiting rescue.

"I like what we do here through NMRC. It has a direct effect on how we support our fleet which can be anywhere in the world," Regis said. "This research can also



Capt. David Regis, an NMRC researcher in the Operational & Undersea Medicine Directorate, gives a presentation during NMHM's science cafe. (Photo courtesy of NMHM Public Affairs)

be applied to commercial or recreational diving. So there is value outside the military as well."

***Naval Medical Research Center would like to wish the Medical Service Corps
Happy 67th Birthday!***

August 4, 1947



Graphic illustration by Mikelle D. Smith, Naval Medical Research Center Public Affairs

Dental Corps Celebrate 102nd Birthday

(continued from page 7)



Capt. Jonathan Stahl analyzes Optical Coherence Tomography (OCT) images to evaluate cracks in teeth. (Photo courtesy of NAMRU-San Antonio Public Affairs)

efficiency of the dental chairside filter previously patented by the Navy.

Capt. Jonathan M. Stahl, DDS, Ph.D. heads the Maxillofacial Injury and Disease Department. Ongoing projects include exploring the use of optical coherence tomography (OCT) to detect tooth cracks. OCT is analogous to ultrasonic imaging, but measures the intensity of reflected infrared light rather than sound waves.

Researchers in the department are working to develop a novel nano-fibrous wound dressing that releases growth factors and may improve healing while reducing facial scarring.

A project is also underway to develop a novel treatment for periodontal disease using genetically modified bacteriophages to target oral pathogens. Further, researchers are developing a new treatment for multi-drug resistant maxillofacial infections that will serve as an alternative to conventional antibiotics.

This project utilizes laser irradiation combined with energy absorbing gold nanoparticles to create opto-acoustic effects that will decrease bacterial biofilm viability.

Dr. John W. Simecek, DDS, MPH, heads the Epidemiology and Biostatistics Department. The distributions of oral, dental, and craniofacial diseases and injuries occurring in Sailors and Marines while deployed or in garrison are assessed in an effort to reduce the rate of dental emergencies.

From the research bench, to chairside, to the field, Navy Dentists have contributed significantly to the Navy and Marine Corps mission.

On this 102nd birthday of the Dental Corps, we recognize the honor, courage, and commitment of this proud component of the Navy and celebrate their many accomplishments.

College Students Participate in DoD Summer Internship at NMRC

(continued from page 12)

career and research interests. Additionally, applicants must be citizens of the United States; However, individuals with dual citizenship are allowed to apply, but will only be accepted to NREIPs at naval research laboratories.

“These interns are the future Navy researchers,” said Edgel. “They are the

individuals that are going to join the Medical Corps and the Medical Service Corps, and we want them to further their career in science. Having been a mentor as well, I understand the importance of taking these interns under your wing to help further them along. The interns are all very smart and extremely bright young adults with amazing potential.”

According to the NREIP web site, the program provides competitive research internships to approximately 275 college students (200 undergraduate students and 75 graduate students) throughout 29 DoN laboratories each year. For more information on NREIP visit the web site at <https://nreip.asee.org>.

Cairo Lab Breaks Ramadan Fast

Story courtesy of NAMRU-3 Public Affairs

CAIRO, Egypt— The U.S. Naval Medical Research Unit No. Three's (NAMRU-3) Locally Employed Staff (LES) Committee, led by co-chairs Sandra Boulis and Bassem AbdelRahman held a traditional IFTAR or “break-fast” meal for all NAMRU-3 personnel and their families, July 17.

Falling at about the midpoint of the lunar month of Ramadan, the meal began just as the sun set on Cairo at 6:58 p.m.

Muslims fast from sunup to sunset as a religious obligation. Once the sun goes down, food is served, water and other drinks are shared, and everyone comes to life after a challenging day of abstinence.

NAMRU-3 U.S. staff and their families shared the Iftar meal with their Egyptian colleagues. The event also included a folkloric show with musicians playing traditional instruments, a team of dancers including a dancing “horse,” and a “tannoura” whirling dancer, whose costume lit up as the dance progressed.

A special cart serving freshly made sweets was a new addition to the annual NAMRU-3 event. A server in special costume served the traditional hibiscus and tamarind juices.

This event was supported by the LES Committee and NAMRU-3 MWR Committee to promote intercultural understanding and promote morale at the command.



NAMRU-3 Commanding Officer, Capt. John Gilstad (middle), accompanies a musical troupe on the drums, while NAMRU-3 staff dance along at the Iftar. (Photo courtesy of NAMRU-3 Public Affairs)

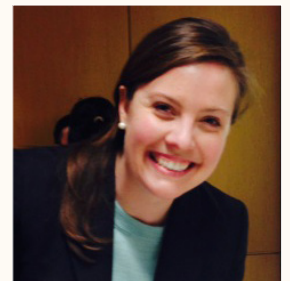
Greetings from the NMRC Ombudsman! Happy 67th Birthday to the Medical Service Corps and Happy 102nd Birthday to the Navy Dental Corps!

We're entering into the dog days of summer and for many of our NMRC families that means it's almost time for the kids to head back to school. This time of year can be tough for military children- especially if your family has just PCS'd. Not only are you starting over again in a new city or country, but also your child is starting at a new school with new teachers and new students.

There are some things we can do to help our “junior shipmates” when they come home from their first day at a new school. First, we must remember they are not as experienced in dealing with change, so they may not be able to fully articulate how they are feeling. Children can be vulnerable to the physical symptoms of stress. Look for headaches, stomachaches, and a tough time falling asleep. Second, remember kids are dealing with new teachers and coaches. Some of these educators won't have the same instructional style as your child's previous teachers and coaches. This can be an adjustment for both your child and the adults. This is why open lines of communication are so important and where the school liaison officer can help.

Accessible through your local Fleet and Family Service office, the school liaison officer or SLO is the Navy's subject matter expert on all things K-12. SLOs understand both the local school system and the unique life of a Navy child and work to connect families with the administrators and educators of the local school system to help ease the transition.

The SLO offers many other services as well including, deployment support, special education assistance, home school support, and post-secondary education preparation. If you have school-age children, make sure you take advantage of this valuable Navy service. It could make the difference between a great first day of school and a bad one. For the local Bethesda School Liaison, call 301-295-7849. For OCONUS, contact your local Fleet and Family Support Center.



Have a Great Navy Day!
Allison